FOREST PEST MANAGEMENT
Pacific Southwest Region

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Pest Management Input to the Granite Watershed Protection Mechanical Thinning and Fuel Reduction Project Environmental Assessment, Groveland Ranger District, Stanislaus National Forest

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Background

The 1973 Granite Fire burned approximately 17,000 acres of forest and non-forest lands on the Groveland Ranger District, Stanislaus National Forest, in Tuolumne County. About 4,500 acres of National Forest land have been reforested and the plantations are now 12-24 years old. Little management has been conducted in these plantations over the past two decades and, at present, they are at risk of catastrophic wildfire and unacceptable insect and disease- related impacts due to between tree competition and a dense understory of brush in many of the stands. The Groveland Ranger District is proposing to use a combination of commercial harvest and service contracts to thin trees, reduce fuels in the plantations and in adjacent forest stands and to create linear defensible fuel profile zones within a 12,078 acre project area. These actions are intended to be implemented under the Granite Project for Watershed Protection and Enhancement which has been designated as a Stewardship Pilot Project (Congressional Bill #H.R. 2882, January 27, 1998).

On July 6, 2000, Lynn Webb and John Schmechel, Groveland Ranger District, and John Wenz, Forest Pest Management Service Area Entomologist, visited several of the plantations in the Granite Project area. The objectives were to (1) review the thinning prescriptions from the perspective of preventing bark beetle related mortality and top-kill and (2) discuss alternatives to reduce the risk of pine engraver beetle related damage resulting from the production of green pine slash during thinning operations. Units 5-132, 5-138 and 5-199 were visited. We also visited Unit 23-044 in the Ever Fire Area, north of Ackerson Meadow, to evaluate recent mortality in ponderosa pine plantations that had been thinned by shredding in the fall of 1999. The Ever Fire occurred in 1987 and the units in question were planted in 1989.

Discussion

(1) Thinning prescriptions.

Most of the plantations are dominated by ponderosa and/or Jeffrey pine with localized occurrences of white fir, incense cedar, Douglas-fir, sugar pine and giant sequoia. Data indicate that basal areas in the stocked stands range from 80 to 165 sq.ft./acre. Stocking levels in 68% (2,883 acres) of the plantations have a stand density index (SDI) greater than 230. An SDI of 230 is considered to be the threshold for "imminent bark beetle mortality" (Oliver, 1995). The SDI's range up to 307 with a majority of the successfully regenerated plantations between 225 and 287. These units are at increased risk to bark beetle attack by the western pine beetle, Dendroctonus brevicomis (Coloeptera: Scolytidae) and the mountain pine beetle, D. ponderosae in ponderosa pine and the Jeffrey pine beetle, D. jeffreyi, in Jeffrey pine.

The thinning prescriptions call for reducing the basal area in these units to between 60 and 110 sq.ft./acre (80-90 sq.ft./acre in most stands). Post-treatment SDI's are projected to range between 75 and 160. Thinning to these levels, provided care is taken to ensure adequate spacing between leave trees, will reduce the risk of these stands to bark beetle attack until growth on the residual trees increases to the point where between tree competition again increases the probability of bark beetle related mortality. In determining how far to reduce basal area during thinning, consideration should be given to how fast the residual stand will grow back into a bark beetle susceptible condition, while also recognizing that opening up the stand too much may allow rapid growth of flammable brush. After 10 years, the projected SDI will typically range between 170 and 300 and about 41% of the stands will have an SDI greater than 230.

(2) Slash treatments- pine engraver beetles.

Thinning, whether by cut-to-length, whole tree removal or shredding, will result in varying amounts and sizes of green slash. The risk of creating pine engraver problems is directly related to the amount and distribution of fresh pine slash (pine engraver brood material) created by the management action.

Pine engraver beetles (Ips spp.) can attack and reproduce in fresh, green, pine slash 3 inches or more in diameter. During weather suitable for pine engraver host colonization and brood development, pine engravers can complete a generation in five weeks. Suitable weather can vary with geographical location and year. In the Granite Project Area, suitable weather can usually be expected, assuming a "normal" winter, from about March/April to October/November. This period can be extended during warm, dry, winters and shortened during cold, wet springs and falls. The next generation adults emerge from the brood material and may attack pines in the residual stand. These attacks can result in top-kill and/or tree mortality. Top-killed pines may be predisposed to subsequent attack by the western, mountain or Jeffrey pine beetle, depending on the host tree species involved.

Although it is not possible to accurately predict exactly when and where and under what circumstances pine engravers will be a problem, the risk of potential pine engraver damage can be reduced by regulating the timing of treatments and minimizing the amount of suitable brood

material available. Following are some general comments and alternatives for treating slash that will reduce the suitability of the brood material and/or reduce pine engraver populations that have developed in the slash:

A) General: Fresh pine slash less than 3 inches in diameter usually does not support populations of engraver beetles likely to attack residual pines. It is not known how frequently slash 3 to 5 or 6 inches in diameter contributes to the development of damaging pine engraver populations. Slash from tree species other than pines do not contribute to pine engraver beetle problem situations.

B) Seasonal Timing of Treatments: Risk of creating pine engraver problems is considered high when brood material is created between March 1 and June 30 and moderate when the material is produced during other times of the year.

C) Removal of the brood material from the site: Removal of potential brood material from the site will reduce the chances of pine engraver damage in the vicinity of the treated site if the material is removed within five weeks of being created. However, if the location to which the material is removed is within about 1/4 to 1/2 mile of other pine stands and the material left on that site is not processed or treated as described below (E) within the appropriate time frames, the pines near the disposal site are at increased risk to engraver beetle attack.

D) Lop and scatter: This involves lopping all branches from the tops and sides of the portions of the main stem 5 inches in diameter and greater. Lopped material should be bucked into sections as short as practical. The lopped material should not be piled but rather scattered so that the material has maximum exposure to the sun. This treatment should be conducted as soon as possible but in all cases, not later than one week, after creation of the brood material. The primary purpose of this treatment is to cause the slash to dry out as fast as possible and become unsuitable as brood material. Slash should never be piled near the base of residual pines.

E) The following methods can be effective in destroying pine engraver brood material and reducing the potential for subsequent damage if they are implemented according to protocols for each method and are completed prior to pine engraver brood emergence (i.e., within five weeks of when the material was created): 1) piling and burning; 2) chipping; 3) de-barking.

F) Cut- To- Length Harvest: This method leaves sawlog and biomass limbs and tops on the site. Operation of the harvester and forwarder tends to crush, compact, break, scar and/or de-bark the slash created by the activity. To the extent that this directly makes the slash unsuitable pine engraver habitat or reduces drying time, the resulting risk of pine engraver damage should be low. However, the risk will increase if material is left in locations around the site relatively intact and particularly if the slash is left in piles or layers that allows for shading and increases drying time. The frequency and extent of pine engraver-related damage following cut- to- length operations have not been well documented.

G) Shredding: Shredding is usually used in stands with relatively small diameter material (< 9 inches in diameter). Mastication often produces slash in relatively small size classes, much of it 5 inches in diameter or less, and usually fairly well scattered over the site. No

evidence was found of pine engravers attacking and colonizing the pine slash generated in Unit 23-044 in the Ever Fire Area, which was thinned by shredding from August 11, 1999 to November 16, 1999.

The low levels of recent ponderosa pine mortality observed in the plantation did not appear to be caused by pine engravers emerging from the shredded slash. The shredded slash showed no evidence of pine engraver colonization. The dead trees exhibited evidence of attack in the mid-bole region by bark beetles, possibly Pityophthorus. No brood was found in the dead trees and no currently infested trees were discovered. In addition, very little mortality was observed in nearby plantations (Units 23-022 and 23-038) that had been thinned and the slash lopped and scattered in 1998 and 1999, respectively, and Unit 23-023, that was thinned and shredded in 1999.

As with cut- to- length harvesting, the likelihood of pine engraver problems resulting from shredding operations is not known. Unless shredding in the Granite Project results in fair amounts of slash 5 inches in diameter or greater, particularly if concentrated in aggregations that provide shading of the material, the risk to damage by pine engravers appears to be low.

H) Monitoring: As noted above, the ability to accurately predict pine engraver problems is limited; pine engraver prevention and management is primarily a matter of risk management. Regardless of what combination of pine engraver management actions are, or are not, implemented, the results should be monitored in terms of subsequent tree growth, mortality and top-kill. This will be particularly beneficial in developing a data base for the cut to length and shredding methods that can be used in planning future projects.

Literature Cited

Oliver, William W. 1995. Is self-thinning of ponderosa pine ruled by Dendroctonus bark beetles? (pp213-218) IN: Eskew, Lane G. (comp.) Forest Health Through Silviculture. Proc. 1995 Natl. Silviculture Workshop, 1995 May 8-11; Mescalero, NM. USDA For. Serv. Gen. Tech. Rep. RM-GTR-267. 246pp.

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Route To:

Subject: Pest Management Input to the Granite Watershed Protection Mechanical Thinning and Fuel Reduction Project Draft Environmental Assessment

To: District Ranger, Groveland Ranger District

Enclosed is FPM Report No. C00-5 that provides pest management entomological input to the Granite Watershed Protection Mechanical Thinning and Fuel Reduction Project Draft Environmental Assessment. The discussion emphasizes prevention of bark beetle-related mortality and alternatives to reduce the risk of potential pine engraver-related problems.

Please contact me at (209) 532-3671 x323 if you have any questions or need additional information.

Sincerely,

John M. Wenz

JOHN M. WENZ
Entomologist

Enclosure

cc: Mike Brown, SO
John Schmechel, GRD
Lynn Webb, GRD